

ABSTRACT

5 METHOD AND APPARATUS FOR A VARIABLE BANDWIDTH MULTI-PROTOCOL X-DSL TRANSCEIVER

 An apparatus and method is disclosed for a variable bandwidth X-
DSL modem. The modem implements a discrete multi-tone (DMT) line
code with varying tone spacing depending on the bandwidth availability
10 on selected subscriber lines. For short subscriber loops that qualify for
high data rates the spacing between tones in a tone set is expanded to
support the higher data rates. A DFT/IDFT engine is implemented in the
DSP with a DFT portion to convert digitized tone sets on a receive path for
each channel to digitized symbols and an IDFT portion to convert the
15 digitized symbols on the transmit path to digitized tone sets. The
DFT/IDFT engine provides variable tone spacing for the at least one
channel. A variable rate interpolator couples to the IDFT portion of the
DFT/IDFT engine and sets the sampling rate at the output of the IDFT to
match the sampling rate of a digital input to the digital-to-analog (DAC)
20 portion of the analog front end (AFE). A variable rate decimator provides
corresponding capability on the receive path. A scheduler couples to the
DFT/IDFT engine for scheduling channels to be processed by the
DFT/IDFT engine during each processing interval. An initialization
procedure is used to determine appropriate tone spacing to be used for the
25 channel based on the loop qualifications of the channel.